

What is claimed is:

1. A method of preparing cellulose ethers comprising the steps of:
- (a) obtaining mercerized and recovered cellulose pulp; and
- (b) converting the mercerized and recovered cellulose pulp into the cellulose ethers,
- wherein the mercerized cellulose pulp in step (a) was mercerized with a cellulose II mercerizing agent, the cellulose pulp is southern softwood kraft, the mercerized and recovered cellulose pulp has a TAPPI 230 om-89 viscosity of at most 12 cP, and when the cellulose ether prepared is hydroxyethyl cellulose, the mercerized and recovered cellulose pulp has at least one of the following properties:
- (i) a TAPPI 230 om-89 viscosity less than 10.4 cP or greater than 11.2 cP,
- (ii) a solubility in 10% sodium hydroxide as determined by ASTM D 1696-95 of greater than 2.3%,
- (iii) a solubility in 18% sodium hydroxide as determined by ASTM D 1696-95 of greater than 1.3%,
- (iv) not been prehydrolyzed, or
- (v) not been bleached with elemental chlorine.
2. The method of claim 1, wherein the cellulose ether prepared is hydroxyethyl cellulose and the mercerized and recovered cellulose pulp has a TAPPI 230 om-89 viscosity less than 9.25 cP.
3. The method of claim 2, wherein the cellulose ether prepared is hydroxyethyl cellulose and the mercerized and recovered cellulose pulp has a TAPPI 230 om-89 viscosity less than 8 cP.
4. The method of claim 1, wherein the mercerized and recovered cellulose pulp has a TAPPI 230 om-89 viscosity less than 9.25 cP.
5. The method of claim 4, wherein the mercerized and recovered cellulose pulp has a TAPPI 230 om-89 viscosity less than 8 cP.

1 6. The method of claim 1, wherein the mercerized and recovered
2 cellulose pulp has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-
3 95 of greater than 3.0%.

1 7. The method of claim 6, wherein the mercerized and recovered
2 cellulose pulp has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-
3 95 of greater than 5.0%.

1 8. The method of claim 1, wherein the mercerized and recovered
2 cellulose pulp has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-
3 95 of greater than 2.0%.

1 9. The method of claim 8, wherein the mercerized and recovered
2 cellulose pulp has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-
3 95 of greater than 4.0%.

1 10. The method of claim 1, wherein the cellulose pulp is not
2 regenerated cellulose pulp.

1 11. The method of claim 1, wherein the mercerized and recovered
2 cellulose pulp is a cellulose floc.

1 12. The method of claim 1, wherein step (a) comprises:
2 (i) mercerizing cellulose pulp; and
3 (ii) washing, neutralizing, or neutralizing and washing
4 the mercerized cellulose pulp.

1 13. The method of claim 12, wherein the cellulose pulp in step (a)(i) is
2 mercerized with an aqueous solution containing from about 9 to about 24% by weight of
3 sodium hydroxide, based upon 100% weight of total aqueous solution.

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1 14. The method of claim 13, wherein the cellulose pulp in step (a)(i) is
2 mercerized with an aqueous solution containing from about 13 to about 24% by weight of
3 sodium hydroxide, based upon 100% weight of total aqueous solution.

1 15. The method of claim 1, wherein step (a) comprises:
2 (i) mercerizing cellulose pulp; and
3 (ii) washing the mercerized cellulose pulp.

1 16. The method of claim 12, wherein the mercerized cellulose pulp in
2 step (a)(ii) is washed with an aqueous solution.

1 17. The method of claim 16, wherein the washing step is continued
2 until the residual water has a pH of less than about 10.

1 18. The method of claim 16, wherein step (a) further comprises (iii)
2 drying the mercerized and washed, neutralized, or washed and neutralized cellulose pulp.

1 19. The method of claim 18, wherein the mercerized and dried cellulose
2 pulp contains less than about 20% by weight of moisture content, based upon 100% weight
3 of total cellulose pulp and water.

1 20. The method of claim 1, wherein step (a) comprises:
2 (i) treating cellulose pulp to form a cellulose floc;
3 (ii) mercerizing the cellulose floc; and
4 (iii) washing, neutralizing, or neutralizing and washing
5 the mercerized cellulose floc.

1 21. The method of claim 1, wherein the mercerized and recovered
2 cellulose pulp is substantially free of cellulose III.

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1 22. The method of claim 1, wherein the mercerized and recovered
2 cellulose pulp contains less than about 3.5% by weight of mercerizing agent, based upon
3 100% by weight of cellulose pulp and mercerizing agent

1 23. The method of claim 22, wherein the mercerized and recovered
2 cellulose pulp contains less than about 0.3% by weight of mercerizing agent, based upon
3 100% total weight of cellulose pulp and mercerizing agent.

1 24. The method of claim 23, wherein the mercerized and recovered
2 cellulose pulp contains less than about 0.03% by weight of mercerizing agent, based upon
3 100% total weight of cellulose pulp and mercerizing agent.

1 25. The method of claim 1, wherein the mercerized and recovered
2 cellulose pulp has an Rx value of greater than 0.57.

1 26. The method of claim 25, wherein the mercerized and recovered
2 cellulose pulp has an Rx value of greater than 0.60.

1 27. The method of claim 26, wherein the mercerized and recovered
2 cellulose pulp has an Rx value of greater than 0.64.

1 28. The method of claim 1, wherein the mercerized and recovered
2 cellulose pulp has at least about 20% by weight of cellulose II, based upon 100% total
3 weight of the crystalline portion of the mercerized cellulose pulp.

1 29. The method of claim 1, wherein the mercerized and recovered
2 cellulose pulp has a total crystallinity of less than about 60% by weight, based on 100%
3 weight of total cellulose pulp.

1 30. The method of claim 1, wherein step (b) comprises converting the
2 mercerized cellulose pulp into the cellulose ethers via a cellulose floc intermediate.

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1 31. The method of claim 30, wherein step (b) comprises:

2 (i) treating the mercerized and recovered cellulose pulp

3 to form a cellulose floc;

4 (ii) alkalating the cellulose floc to form an alkali

5 cellulose; and

6 (iii) etherifying the alkali cellulose to form the cellulose

7 ethers.

1 38. The method of claim 1, wherein the cellulose ether is a
2 carboxymethyl cellulose.

1 39. The method of claim 1, wherein the cellulose ether is a methyl
2 cellulose.

1 40. The method of claim 1, wherein the cellulose ether is a nonionic
2 ether.

1 41. The method of claim 1, wherein the cellulose ether is an ionic ether.

1 42. A carboxymethyl cellulose ether prepared by the method of claim
2 38.

1 43. A methyl cellulose ether prepared by the method of claim 39.

1 44. A nonionic cellulose ether prepared by the method of claim 40.

1 45. An ionic cellulose ether prepared by the method of claim 41.

1 46. A method of preparing cellulose floc comprising the steps of:
2 (a) obtaining mercerized and recovered cellulose pulp, and
3 (b) treating the mercerized pulp to form the cellulose floc,
4 wherein the cellulose pulp is southern softwood kraft and the mercerized and recovered
5 cellulose pulp is substantially free of cellulose III and has a TAPPI 230om-89 viscosity of
6 at most 12 cP.

1 47. The method of claim 46, wherein the mercerized and recovered
2 cellulose pulp has a TAPPI 230 om-89 viscosity less than 10.4 cP or greater than 11.2 cP.

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1 48. The method of claim 47, wherein the mercerized and recovered
2 cellulose pulp has a TAPPI 230 om-89 viscosity less than 9.25 cP.

1 49. The method of claim 48, wherein the mercerized and recovered
2 cellulose pulp has a TAPPI 230 om-89 viscosity less than 8 cP.

1 50. The method of claim 46, wherein the mercerized and recovered
2 cellulose pulp has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-
3 95 of greater than 2.3%.

1 51. The method of claim 50, wherein the mercerized and recovered
2 cellulose pulp has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-
3 95 of greater than 3.0%.

1 52. The method of claim 51, wherein the mercerized and recovered
2 cellulose pulp has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-
3 95 of greater than 5.0%.

1 53. The method of claim 46, wherein the mercerized and recovered
2 cellulose pulp has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-
3 95 of greater than 1.3%.

1 54. The method of claim 53, wherein the mercerized and recovered
2 cellulose pulp has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-
3 95 of greater than 2.0%.

1 55. The method of claim 54, wherein the mercerized and recovered
2 cellulose pulp has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-
3 95 of greater than 4.0%.

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1 56. The method of claim 46, wherein the mercerized and recovered
2 cellulose pulp has not been prehydrolyzed.

1 57. The method of claim 46, wherein the mercerized and recovered
2 cellulose pulp has not been bleached with elemental chlorine.

1 58. The method of claim 46, wherein step (a) comprises:
2 (i) mercerizing cellulose pulp; and
3 (ii) washing, neutralizing, or neutralizing and washing
4 the mercerized cellulose pulp.

1 59. The method of claim 46, wherein the mercerized and recovered
2 cellulose pulp contains less than about 3.5% by weight of mercerizing agent, based upon
3 100% by weight of cellulose pulp and mercerizing agent

1 60. The method of claim 59, wherein the mercerized and recovered
2 cellulose pulp contains less than about 0.3% by weight of mercerizing agent, based upon
3 100% total weight of cellulose pulp and mercerizing agent.

1 61. A cellulose floc prepared by the method of claim 46.

1 62. A method of preparing mercerized cellulose floc comprising the
2 steps of:

3 (a) mercerizing the cellulose floc; and
4 (b) recovering the mercerized cellulose floc,
5 wherein the mercerized and recovered cellulose floc is substantially free of cellulose III,
6 the cellulose floc is derived from southern softwood kraft, and the mercerized and
7 recovered cellulose floc has a TAPPI 230 om-89 viscosity of at most 12 cP.

1 63. The method of claim 62, wherein the mercerized and recovered
2 cellulose floc has a TAPPI 230 om-89 viscosity less than 10.4 cP or greater than 11.2 cP.

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1 64. The method of claim 63, wherein the mercerized and recovered
2 cellulose floc has a TAPPI 230 om-89 viscosity less than 9.25 cP.

1 65. The method of claim 64, wherein the mercerized and recovered
2 cellulose floc has a TAPPI 230 om-89 viscosity less than 8 cP.

1 66. The method of claim 62, wherein the mercerized and recovered
2 cellulose floc has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-
3 95 of greater than 2.3%.

1 67. The method of claim 66, wherein the mercerized and recovered
2 cellulose floc has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-
3 95 of greater than 3.0%.

1 68. The method of claim 67, wherein the mercerized and recovered
2 cellulose floc has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-
3 95 of greater than 5.0%.

1 69. The method of claim 62, wherein the mercerized and recovered
2 cellulose floc has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-
3 95 of greater than 1.3%.

1 70. The method of claim 69, wherein the mercerized and recovered
2 cellulose floc has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-
3 95 of greater than 2.0%.

1 71. The method of claim 70, wherein the mercerized and recovered
2 cellulose floc has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-
3 95 of greater than 4.0%.

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1 84. The method of claim 75, wherein the mercerized and recovered
2 cellulose pulp has not been bleached with elemental chlorine.